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Oil Export System Vulnerability in the 1980s: The Unconventional Threat

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An Intelligence Assessment

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Key Judgments

Information available as of 30 September 1984 was used in this report.

Oil facilities have long been intermittent targets of insurgents and terrorists throughout the Third World, and the pace of attacks on oil production and export operations has increased rapidly in recent years. Moreover, our analysis of available data indicates the percentage of attacks against the more critical production and export facilities has been on the rise in the 1980s. In our view, the dispersed nature of production and export operations, oil's economic and political importance to producing countries, and the symbolism of ties to the West will continue to make these facilities attractive targets for saboteurs, terrorists, and revolutionaries.

As part of this assessment, we conducted a worldwide review of efforts to reduce oil system vulnerability.

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Moreover, if world oil demand pushes production nearer to capacity levels by the end of the decade as most industry forecasts indicate, a major oil disruption could also have a significant impact on world oil prices and supply availability.

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Introduction

Smooth operation of crude oil production and export systems is essential to the economic and political well-being of most major oil-producing countries in the Third World. Many less developed countries rely on crude oil exports to generate revenues for virtually all national development and welfare programs. Revenues from oil sales generate much of an oil-producing country's gross national product and nearly all of its tax revenues. Several of these countries face a significant threat to the operation of their oil systems from unconventional attack—saboteurs, terrorists, insurgents, and even covert action by foreign commando forces. Besides the threat to internal security posed by successful unconventional attacks on oil systems, there may also be a risk to the international oil market if a sizable portion of oil production is lost for a substantial period.

Record to Date

Petroleum facilities have long been favorite targets for unconventional attacks, and the frequency of attacks appears to be growing. Detailed records of attacks against oil facilities in both producing and consuming countries go back to at least 1968 when Palestinian terrorists attacked Israel's oil import facility at Eilat. In the 1970s about 400 such attacks are estimated to have occurred against energy facilities worldwide—about a third of which were oil related. a total of more than 140 incidents in 1981-82 involved nonnuclear energy facilities, predominantly oil systems (table 1). Unconventional attacks against oil facilities in the first half of 1984 are proceeding at a rate greater than any recorded.

Although only a fraction of the terrorist attacks on oil facilities have been directed at crude production or export operations, there have already been as many such attacks in the 1980s as in all of the 1970s (table 2). The importance of crude oil production and export systems as targets for attacks has grown as instigators have come to recognize the high visibility gained from effective attacks, the ease with which certain facilities can be attacked, and the potential economic impact such attacks can have. Moreover, as petroleum installation attacks have become more frequent, they have also become more effective, largely because of improved insurgent and terrorist target selection. For example, nearly 40 percent of all terrorist attacks on petroleum-related facilities in the 1980s targeted oil export activities, up from 30 percent in the 1970s.

Table 1
Petroleum Facilities: Unconventional Attacks, September 1981–September 1982 [a]

Year	Total Incidents	North America	Europe	Latin America	Asia	Middle East, North Africa, Persian Gulf	Saharan Africa
Total	**258**	**42**	**32**	**105**	**8**	**53**	**18**
1960	1			1			
1965	1					1	
1968	1					1	
1969	1	1					
1970	0						
1971	5		1			4	
1972	5		4			1	
1973	6			1		5	
1974	4	1		2	1		
1975	9	8				1	
1976	4	3					1
1977	18	7	1	7		2	1
1978	18	6	1	5	1	2	3
1979	15	1	3	2	1	5	3
1980	27	4	6	4	1	9	3
1981	85	6	13	52	3	6	5
1982	58	5	3	31	1	16	2

[a] Data include terrorist attacks.

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Table 2
Petroleum-Related Facilities: Selected Terrorist Attacks, 1968-84

Date	Type of Attack	Facility	Location	Damage	Perpetrators	Target
1968	Bazooka	Oil installation	Eilat, Israel	Minor	Palestinians	Israel
1969 [a]	Explosives	Trans-Arabian pipeline (Aramco)	Golan Heights	Minor	PFLP	Intended to pollute water for Israeli settlements.
1969	Explosives	Pipeline	Haifa, Israel	Minor	PFLP	Israel
1969	Explosives	Pipeline/electric pylon	Haifa, Israel		Al Fatah	Israel
1970	Explosives	Refinery (US-Medreco)	Sidon, Lebanon	Moderate	PFLP	United States
1971	Explosives	Esso headquarters	Manila, Philippines	Moderate	People's Revolutionary Front	United States
1971	Explosives	Caltex headquarters	Manila, Philippines	Minor	People's Revolutionary Front	United States
1971	Explosives	Esso-Pappas offices	Athens, Greece	Minor	Greek Militant Resistance	United States
1971	Explosives	Gulf refinery	Rotterdam, Netherlands	Major	Al Fatah	
1971 [a]	Explosives	Tapline (Aramco)	Jordon	Moderate	Jordanian Fedayeen	Israel
1971	Bazooka	Tanker	Red Sea	Minor	PFLP	Israel
1972 [a]	Sabotage	Kuwait Oil Company	Kuwait	Major		United States
1972 [a]	Explosives	Oil tanks at Gulf's GOSP	Bavenstein, Netherlands	Moderate	Black June	Israel
1972	Sabotage	Esso pipeline	Hamburg, West Germany	Minor	Black September	Israel
1972	Explosives	Oil tanks at Trans-Alpine, oil terminal (port)	Trieste, Italy	Extensive	PFLP, Black September	West Germany and Austria (supporters of Israel)
1972 [a]	Explosives	Pipeline	Saudi Arabia	Major	Jordanian Republican Army	Imperalism; the Arab Nation
1973	Explosives	Oil tanks, pipelines (Caltex-Mobil)	Sidon, Lebanon	Minor	Lebanese Revolutionary Guard	United States (for Israel)
1973 [a]	Explosives	Tapline	Zahrani, Lebanon	Minor	PFLP and GP	Israel
1973	Fire	Storage depot	Besancon, France	Minor		
1973	Sabotage—valves opened	Installation	Belfort, France	Minor		
1975	Explosives	Pumping station	Eilat, Israel	Major	Palestinians	Israel
1976	Firebomb	Texaco offices	Florence, Italy	Minor	Armed Communist Formations	United States
1976	Explosives	Chevron-FINA-Total refinery	Italy	Moderate	Italian terrorists	
1977 [a]	Explosives	Iraq-Turkey pipeline	Turkey	Minor	Unknown	Iraq
1978	Explosives	Abu Dhabi refinery	Abu Dhabi, UAE	Minimal	Omani	United Arab Emirates
1979	Explosives	Natural gas storage tanks	London, United Kingdom	Extensive	IRA	United Kingdom
1979	Explosives	Oil tanker	Eilat, Israel	Minimal	Al Fatah	Israel
1979 [a]	Explosives	Pipeline	Angola	Minor	FLEC	

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Table 2 (continued)

Date	Type of Attack	Facility	Location	Damage	Perpetrators	Targets
1980	Explosives	Texaco refinery	Trinidad and Tobago	Minor		
1980	Explosives	Kuwait Oil Company offices	London, United Kingdom	Minor		
1980 [a]	Explosives	Iraq-Turkey pipeline	Turkey	Major	Kurds	Iraq
1981	Firebomb	Esso compound buildings	San Salvador, El Salvador	Major	Rebels	El Salvador Government
1981	Fire; handguns	Petroleum exploration	Guatemala	Moderate	Cubans	US supervisors
1981	Explosives	Shell headquarters	Hong Kong	Minor		Money from Shell
1981	Dynamite; handgun	Refinery	Rubles Santos, Guatemala	Extensive		
1981	Explosives; rifle	Chevron oil depot	Guatemala City, Guatemala	Major	Popular Front (FP 31)	In the name of the poor
1981	Dynamite	Oil pipeline	Rubele Santo–Puerto Barrios, Guatemala	Minor	Guerrilla Army of the Poor (EGP)	Against foreign investment
1982 [a]	Explosives	Tripolil spur of Kirkuk-Baniase pipeline	Tripoli, Lebanon	Extensive		
1982 [a]	Explosives	Iraq-Turkey pipeline	Near Syrian border	Minor	Syrian	Iraq
1982 [a]	Explosives	Tripoli spur of Kirkuk-Banias pipeline	Akkar, Lebanon	Major	Iraqi Mujahedin movement	Iraq
1983	Soviet-made 122-mm rockets	Sasol III oil production facility	South Africa	Unsuccessful	ANC Activist	South African Government
1983	Explosives	Caltex fuel depot	Maseru, Lesotho	Extensive		
1983	Explosives	Dowell Schlumberger headquarters complex	Colombia	Extensive	National Liberation Army (ELN)	United States; Colombian Government
1984 [a]	Explosives	Algeria-Tunisia pipeline	Tunisia	Extensive	Libyans	Tunisia
1984 [a]	Explosives	Algeria-Tunisia pipeline	As-Su Khayrah, Tunisia	Moderate	Libyan commandos	Tunisia
1984	Armed attack	Chevron drilling barge	Rub Kona, Sudan	Major	Sudanese dissidents —Libyan/Ethiopian backed	Sudanese Government; Chevron
1984 [a]	Explosives	Colombian Petroleum Enterprise pipeline	Colombia	Minor	Colombian	Colombia
1984	Explosives	Sarir Marsa–al Hariqa pipeline	Libya	Minor	Libyan National Salvation Front	Libya

[a] Categorized as attacks on oil operations affecting exports. Other attacks have targeted offices, refineries, or other petroleum facilities not essential to crude oil production and export.

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The distribution, nature, instigator, targets, and effects of these attacks have been extremely diverse. Among the confirmed attacks are:

- Ten members of the People's Revolutionary Front broke into the headquarters of Esso and Caltex in Manila, detonated bombs, and killed one employee in 1971.

- In 1973 members of the Lebanese Revolutionary Guard launched a commando attack against the Caltex-Mobil facilities in Sidon, destroying pipelines and one oil storage tank and badly damaging three other tanks.

- Various facilities of ECOPETROL, the state-owned oil corporation in Colombia, were the target of at least 14 incidents of rural guerrilla and urban terrorist activities in 1977. The severity and length of the unconventional operations resulted in significant shortages of crude oil for refineries and in nationwide gasoline shortages.

- Iranian commandos in 1980 stormed Iraq's two main export terminals—Mina al Bakr and Khor al Amaya—inflicting substantial damage to loading arms, generators, control facilities, and berths. These attacks closed the terminals, each of which had a capacity of 1.6 million b/d.

- The Iraq-Turkey export pipeline was attacked several times by Iranian-backed Kurdish insurgents in 1980. The attacks took place in remote areas far from routine patrols and caused major damage to the pipeline, which is now Iraq's sole operating export pipeline.

- Devastatingly effective bombings of oil storage tanks at oil-coal plants in Johannesburg in 1980 caused $7.5 million in damage. Responsibility was claimed by the African National Congress. The well-planned attacks were among the first in a series of terrorist attacks against a variety of South African energy targets.

- Six members of the Libyan National Salvation Front reportedly carried explosives across the desert from near the Egyptian border and destroyed a small portion of the Sarir-Marsa-al-Hariqah pipeline earlier this year. This was a successful penetration of one of the best patrolled and secured export pipelines in Libya.

- Also this year, four members of a Libyan-backed terrorist group used dynamite to damage the Algerian-Tunisian export pipeline. 25X1

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Attacks by subnational terrorist or insurgent groups have frequently been directed against offices rather than against production, transportation, or export facilities, according to available data. In our view, such actions minimize the risk of undermining popular support for terrorist causes that might result from creating economic hardships for the local populace. Still, where petroleum facilities have been viewed as symbols of Western exploitation, there have been significant effective attacks. In 1972 former employees of the Kuwait Oil Company—a company with US interests—used plastic explosives to destroy processing facilities. In a newspaper letter claiming credit for the incident, they demanded that the United States relinquish any involvement in Kuwaiti or Middle

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Eastern affairs. In 1976 export pipelines constructed and operated by Texaco and Mobil in Venezuela were dynamited several times. The recent attacks by Libyan-backed Sudanese dissidents against US and French oil development activities in Sudan also illustrate this kind of unconventional threat.

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Reducing Oil System Vulnerability

Developing a comprehensive program to reduce the vulnerability of a national oil system is a difficult, complex, time-consuming, and expensive task. For the most part, efforts directed at reducing system vulnerability can be divided into three categories:

- Preventing attacker access to the oil facility through physical and personnel security programs, as well as intelligence measures.
- Limiting the damage caused in an attack through effective firefighting and oilspill programs.
- Restoring oil operations as quickly as possible using contingency plans and materials developed well in advance of an attack.

Physical Security. Despite the availability of modern detection and entry-protection technology, it remains impossible to provide absolute physical security against unconventional attacks. Measures to safeguard oil facilities provide at best only a minimum deterrent and leave vulnerable many portions of the system. Substantially reducing a total system's vulnerability through physical security measures alone would be extremely costly, primarily because of the unpredictability of attacks and the indefensibility of petroleum systems themselves—the extensive facilities, their decentralization, the equipment's complexity, and the large number of employees. In addition, security practices generally treat protection as a guarding function—usually by the military—rather than as an intelligence problem.

Damage Control. Certain levels of disruption from unconventional attacks can be anticipated and are best countered by effective emergency programs to limit damage and restore production, processing, transportation, and exports. We know of no systematic effort by oil-exporting countries, including the Persian Gulf countries, to institute major damage control or restoration programs. In our view, damage control programs should focus on developing the ability of each facility to quickly control fires and oilspills caused by unconventional attacks more severe than normal industrial accidents. Over the longer term, these programs should look at amending operating procedures and design and construction programs to reduce oil facility vulnerability.

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Facility Restoration. An emergency oil system restoration program would aim at returning oil production levels to preattack levels as quickly as possible. Such a capability would require prior engineering analysis and planning to identify choke points and specify procedures for alternative restoration options—repair, replace, or bypass—to deal with differing damage levels. It may also outline plans for potential cannibalization of working equipment. A complete restoration program would also include acquisition of a stockpile of critical custom-manufactured equipment to ensure rapid restoration of oil exports. Most countries, however, have been unwilling to bear the cost of contingency planning and preparation and instead have elected to focus on security measures.

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Country Response to the Threat

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The oil-exporting countries of the Persian Gulf are perhaps most aware of the vulnerability of their oil facilities and seem to be working hardest to increase protection for critical facilities. Potential unconventional threats to their facilities are posed by Shiite minority workers in Saudi Arabia, Bahrain, Qatar, and the UAE; by disaffected tribal groups within each country; and by commando forces from Iran. The response to the potential threat of damage has been limited and varies sharply between countries. Attempts by the Gulf Cooperation Council to develop coordinated security plans to respond to terrorist and other unconventional threats have not been successful.

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In *Saudi Arabia,* the possibility of worker sabotage is high, as 25 to 30 percent of the approximately 70,000 Arabs in the work force of the national oil system operating company, Aramco, is Shia. The Shia work force, however, is essential to operations because of traditional Sunni reluctance to work as carpenters, masons, and welders. While nationals of Syria, Iraq, Jordan, the People's Democratic Republic of Yemen, and Egypt are banned from working in sensitive Aramco installations, the restrictions cannot be practically applied to Saudi Shias.

Outside of the Middle East the security response to terrorist threats or incidents has generally been much less. In lesser developed nations—*Venezuela, Ecuador, Gabon, Nigeria,* and *Indonesia*—increasing security usually depends on the deployment of troops to refineries, pumping stations, and loading terminals; construction of manned observation towers to monitor strategic pipeline sections; and use of regular aerial surveillance over remote areas. In most of the Latin American and African exporting countries, oil companies' security forces are primarily trained to deter theft; oilfield and oil facility protection is left to national guard and military forces.

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Of the North African producers, *Egypt* and *Libya,* each has facility security about on a level with that of the Middle Eastern producing nations. Both nations are wary of each other, as well as of an Israeli threat. Security is best near borders, with perimeter fencing, patrols, and detection equipment. Egypt has undertaken some studies to determine restoration strategies; Libya apparently has not. *Algeria's* security is limited to pipeline patrols and to nonaggression agreements with Libya. To help protect the export pipeline and terminal for its crude in *Tunisia,* Algeria subsidizes the Tunisian Government for increased military expenditures.

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attempt to achieve political goals in the important oil-producing regions of the Middle East and North Africa. 25X1

Our analysis indicates that security efforts by national governments and operating oil companies in most oil-exporting countries will not increase significantly to reduce vulnerability to unconventional attacks. Our judgment is based largely on the failure of the Arab countries of the Persian Gulf to implement effective security and contingency plans despite the clearly recognized military—as well as the unconventional—threat posed by Tehran. We believe an effective oil system security program involving physical, personnel, and intelligence elements would take two to three years to implement fully and efficiently. This lead-time suggests that any action that may be effective in the 1980s on other than a crisis basis would have to be under consideration in the next two or three years. We have seen little evidence of such planning. 25X1

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Prospects and Implications

As long as energy exports are a focal point of political and economic conflict, we believe oil systems will remain an important target for unconventional attacks. In our view, the limited history of unconventional attacks on oil facilities also suggests a trend of increasing attacks in the Middle East and North Africa, most involving support from a foreign country. Domestic insurgent and terrorist organizations, which normally rely on or hope to obtain the support of the populace against the regime, are not likely to attack oil facilities in a manner that would have broad economic impact on the country. These groups, however, may continue intermittent attacks to demonstrate their strength and articulate their goals. We believe most of the growth in unconventional attacks will probably come from the greater use of state-sponsored terrorist and commando activities, particularly as countries such as Iran, Libya, and Syria

Although we believe the probability of such an attack is low at present, the impact on oil prices could be quite substantial later in the decade when most industry forecasters expect oil demand to push production to near capacity 25X1

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